AH Draft
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BRONCHITIS AND EMPHYSEMA

Introduction

Existing knowledge of the nature and behavior of the conditions known in the United States as chronic bronchitis and pulmonary emphysema is, unfortunately, extremely limited. Claims that certain factors, including cigarette smoking, are implicated in the etiology of these diseases must be considered in the light of this paucity of knowledge. Study of these conditions for well over a century has resulted in a large body of literature. Nevertheless, there appears to be broad agreement among contemporary authors that for the most part the clinical delineation of these conditions is uncertain and their pathogenetic mechanisms remain unknown.

From a limited approach to the problem, some workers have concluded that the prevalence of these diseases is affected by such factors as air pollution, infectious diseases, cigarette

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smoking and other environmental influences. ~~While this work need not be ignored,~~ It is nevertheless true that the main body of literature is still devoted to attempts to develop more refined clinical, pathological and epidemiological data. Efforts to achieve understandings among investigators in different countries which would permit meaningful discussions of observations and comparisions of data are only now beginning. These efforts should produce accurate data reflecting the extent to which - if at all - these diseases, or any of them, represent an acute public health problem.

Although reliable statistics are lacking, it seems clear that respiratory diseases were prevalent and were important causes of death in the United States in the nineteenth century. At the beginning of the twentieth century, 26% of the deaths in the United States were attributed to diseases of the respiratory system. By 1940, deaths attributed to this group of diseases had dropped to 11%. In 1959, diseases of the respiratory system accounted for only 8% or 1 out of

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every 12 deaths in the United States. Nevertheless, in recent years, attention has been drawn to some of them which, it is claimed, are assuming major proportions.

~~It is only in the past ten or fifteen years that bronchogenic carcinoma came to be viewed as a grave threat to the health of the community.~~ The discussion of the past 10 years concerning the possible relationship of cigarette smoking to ~~this disease~~ bronchogenic carcinoma was recently broadened to include other chronic respiratory diseases. In England attention was directed to the high ~~official~~ reported death rates from chronic bronchitis and some writers began to attribute an important role to smoking in the production of that disease although it had been widespread for well over a century at least. In the United States where emphysema seemed to be the disease more frequently diagnosed, suggestions that smoking was an important factor in that disease ~~also began~~ have begun to appear in the literature, ~~in recent years.~~

We have set out below a number of unsolved points and

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uncertain situations which would seem to impair the value and complicate the interpretation of existing studies of these diseases. Six questions indicate the principal areas of uncertainty and disagreement.

A. ~~Is~~ Has not the definition of these diseases been ~~sufficiently~~ so unclear and incomplete as to ~~permit~~ impede accurate collection and evaluation of data?

Little progress can be made toward determining the influences responsible for chronic bronchitis and emphysema before clear and uniform concepts of their medical features are established. Authorities acknowledge the present need for definitions in order to provide uniform diagnostic criteria and to furnish a framework within which to evaluate the observations of different investigators. Though efforts are presently being made in this direction, studies to date have not been based upon any accepted standard of definition, and interpretation and comparison of results is difficult if not impossible.

The difficulty underlying the failure to achieve a widely

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accepted system of definition lies in the differences of opinion among clinicians concerning the clinical picture and natural history of these diseases. Thus it is seen that while some workers regard cough, dyspnea or sputum production as characteristics of one or more forms of chronic respiratory disease, others insist upon clearer distinguishing symptoms.

Some clinicians propose that bronchitis and emphysema are distinct clinical entities, while others insist that the conditions so designated are merely different forms or stages of the same disease process. ~~Accordingly,~~ there is disagreement whether bronchitis proceeds from emphysema or emphysema proceeds from bronchitis or whether the simultaneous existence of the signs or symptoms of bronchitis and emphysema should be considered as one disease or as the co-existence of two independent diseases.

Though severe pulmonary insufficiency can be recognized easily, doubt has been expressed whether pulmonary emphysema can be differentially diagnosed clinically or whether its

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diagnosis can only be made consistently from special preparations of lung tissues or entire lungs. There is no general agreement among pathologists on the kind and degree of tissue changes necessary to justify the diagnosis either of bronchitis or emphysema, nor as the questions (1) whether the several distinct pathological forms of pulmonary emphysema represent separate diseases and (2) it is possible to separate those conditions said to represent "genuine" pulmonary emphysema from other conditions which are said merely to simulate emphysema.

Discussions have been going on recently between clinicians in the United States and England concerning whether the condition described by English physicians as chronic bronchitis is the same, or different from, the conditions commonly described in the United States as chronic bronchitis or pulmonary emphysema. Though it is sometimes argued that the issue is merely one of semantics, the fact is that a comparison of cases diagnosed on the same basis indicates that bronchitis in England is a disabling condition in a far greater proportion of cases

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than either bronchitis or emphysema in the United States.

B. Is/~~there sufficient understanding of the~~ pathogenesis not the so ill-understood as to prohibit ascribing of these diseases/~~to ascribe~~ etiological significance to factors claimed to be associated with certain functional disturbances or structural changes?

Attempts to relate certain exogenous factors, including smoking, to conditions such as cough or sputum production or to certain functional disturbances or to alterations in lung tissues have been made. It is suggested that the demonstration of such relationships indicates the importance of such exogenous factors in the production of chronic bronchitis and emphysema. There are good reasons for challenging this assertion.

Some features of "bronchitis" and "emphysema" occur at times and to some degree in all living persons. Many of the clinical and functional alterations used as diagnostic criteria are not unique to these diseases and there is no general agreement as to the degree of clinical symptoms or other criteria necessary to define the presence of disease.

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No 90 There are progressive changes in the normal lung from birth onward. Many individuals encounter viral, bacterial and fungal infections in their lifetimes which may produce structural or functional abnormalities in the respiratory tract. In addition, the gross and microscopic anatomy of the normally aging lung must be defined to evaluate realistically the pathologically altered lung. The effects of such factors as age, sex, race, occupation and locale create difficulties not yet overcome in efforts to establish criteria for the diagnosis of bronchitis and emphysema.

An example of the uncertainties that have created an indistinct borderline between what is or is not significant to the problem is so-called "smokers' cough" said by some writers to suggest that cigarette smoking is a significant factor in the production of chronic bronchitis. Coughing is common. This loosely defined symptom may be due to a great variety of conditions in the upper or lower respiratory tract and very often to an even greater variety of conditions

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of other organs in the neck, head and chest. It may also be of neurogenic origin.

Nor can ~~S~~urveys indicating as association between cigarette smoking and cough with expectoration be considered to have any ~~are also of doubtful~~ clear significance. The interpretation of cough of some arbitrary duration and the expectoration of a certain amount of phlegm as respiratory disease is questionable. Further doubt is warranted in view of the incomplete medical histories of the subjects and because of the small groups surveyed. So far as functional impairment and obstructive lung disease are concerned, the highest degree of association observed in the studies was with increased age.

~~Aren't there a number of fundamental~~

C. ~~What are some of the limitations affecting the usefulness of statistical data in the study of these diseases?~~

~~Respiratory disease mortality trends~~ ~~center~~

C. Are not the available statistical data insufficient to determine the trend of these diseases over the years and their current prevalence.

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Trends in the death rates from the several chronic respiratory diseases during recent decades are impossible to determine with accuracy because no clear, consistent distinction has been or is being made in the usage of diagnostic terms. Furthermore, changes in coding rules and systems of classification have had the effect of shifting the assignment of a significant number of deaths from one disease category to another at various times in the past.

The marked increase in reported death rates from chronic respiratory diseases in the United States which appears to have begun around 1949 corresponds in time with the adoption of a major change in the method of coding and classifying causes of death and the acceptance of an accompanying revision in the procedure for selecting the underlying causes of death. Immediately following those changes, there appeared a sudden and precipitous jump in reported death rates from chronic respiratory diseases. For several decades prior to

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that time, recorded mortality from these diseases had been steadily declining. ~~It has been suggested~~ This picture has given rise to conflicting interpretations. ~~that the reported increase in death rates since 1949 actually began several decades before that date but was concealed by past methods of classifying official mortality statistics. On the other hand, it is~~ Others have conceded that it is impossible to say with any degree of certainty whether the sharp rise in mortality rates since 1949 reflects a real increase in incidence or is an artifact resulting from the changes in classification and reporting and from such acknowledged factors as improved methods of diagnosis and changes in use of nomenclature and habits of diagnosis on the part of practicing physicians.

No ¶

It has also been noted that the recorded increase in deaths from bronchitis and emphysema since ~~1950~~ 1949 has been accompanied by a large decline in deaths attributed to pneumonia and tuberculosis, and that the prevalence of the latter diseases in earlier years may have masked a large amount of clinical bronchitis and emphysema.

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It has been postulated too that the respiratory system is more susceptible to disease than any other organ system and that if the lethal form of any one respiratory disease is controlled, it will soon be replaced, in whole or in part, by an increase in the diagnosed and perhaps fatal form of some other respiratory disease.

~~2. Current prevalence in United States.~~

It is doubtful whether the limited data available provide any reliable basis for assumptions concerning the incidence or prevalence of any form of chronic respiratory disease in the general population. A few surveys have been conducted among selected populations in which it has been attempted through the use of questionnaires and simple pulmonary function measurements to identify individuals with symptoms which are assumed to be manifestations of these particular forms of pulmonary disease. Many writers have disputed the assumption that the observed "symptoms" actually reflect the disease which they are said to represent.

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D. ~~Is the pattern of distribution of chronic bronchitis and emphysema such as to suggest an association with some ubiquitous factor?~~

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~~E. What are some of the peculiarities in the distribution of chronic bronchitis and emphysema seen from present data?~~

It may be questioned whether death rates from these diseases can be compared from one country to another because of the variability of definitions of the diseases from place to place and differences in practice in death certification. However, insofar as vital statistics are available and can be compared, they indicate enormous variations in the mortality rates among the various recorded chronic respiratory diseases from country to country.

~~Vital statistics~~ They also indicate great variations in the importance of the several chronic respiratory diseases in relation to total mortality from country to country. Thus

Chronic bronchitis and emphysema have been said to be "conspicuous by their absence" in tropical areas (though acute respiratory diseases and tuberculosis are common), and are found in increasing frequency as one approaches

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the temperate zones. It has also been observed that countries with the highest mortality rates are those with cold, damp climates.

In countries where statistics are available, it is uniformly found that death rates from chronic bronchitis and emphysema are significantly higher in urban than in rural sections and appear to follow a social class gradient being significantly greater in the lower socio-economic classes.

Though large variations in the sex ratios in incidence of, and in mortality from, these diseases are noted from country to country and from one time period to another within the same country, they are invariably far more prevalent in men than in women.

It has been suggested that emphysema is particularly a disease of white males, being virtually absent in colored ~~men~~ males.

4. ~~Do the~~ epidemiological ~~studies fully support~~ the smoking theory of etiology of chronic respiratory diseases?

Is not the sum total of present data inconclusive as to

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Reported death rates from bronchitis and emphysema among white males in the United States showed a slight decline from 1930 to 1950. A sharper decline in deaths was seen among white females in the same period. During the period from 1930 to 1950 and for several decades before, cigarette smoking was increasing steadily among males. Consumption of cigarettes among women began to rise rapidly, beginning in the 1920's. Beginning in the 1930's, cigarette smoking was increasing more rapidly among women than among men. Thus the reported mortality trends based on the only data available are seen to be unrelated to trends in cigarette smoking.

what about your clarification above

Reported death rates from chronic bronchitis, when compared from country to country, show no correlation with cigarette consumption. For example, the death rate from bronchitis in England and Wales in 1956 was vastly greater than the death rate in the United States, whereas per capita cigarette consumption in the United States was far greater than in England and Wales.

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In 1958 the Scottish death rate was about 20 times greater for men of all ages and about 30 times higher for men aged 55-60 than for corresponding groups in the United States, though cigarette consumption was lower in Scotland than in the United States.

Data from Scotland also indicates that the male-female ratio of death rates from chronic bronchitis has been increasing for many decades. During part of this period it is probable that the ratio of male to female cigaretee consumption has been decreasing.

Bronchitis was regarded as an important cause of death in England long before the advent of the habit of cigarette smoking and there has been no dramatic proven increase in recorded death rates from this disease since cigarette smoking became widespread.

Studies of limited populations have failed to yield conclusive data.

(a) Since chronic bronchitis and emphysema are classified on the basis of both relatively tenuous and

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unsettled diagnoses, the studies asserting a close association between smoking and these conditions require cautious interpretation. ~~should be interpreted with caution.~~

(b) The validity of defining these diseases by simple pulmonary function tests is highly questionable.

(c) It is likewise doubtful whether answers to questionnaires used in most surveys give a reliable indication of the prevalence of the disease under investigation.

(d) In one study it was found that one-third of those patients thought to have emphysema were non-smokers, and that smoking did not appear to affect the type of emphysema observed.

(e) Another study found cigarette smoking unrelated to decreased forced expiratory rate, one of the functional parameters of emphysema.

All studies indicate that bronchitis and emphysema occur among non-smokers so that smoking is proven not to be a necessary factor.

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Other factors are associated with a high death rate from bronchitis and emphysema. For example, in one study, mortality from "chronic bronchitis" was found to be five times greater in unskilled laborers than in professional men. Higher mortality rates from respiratory diseases are found in urban areas as compared to rural districts. Mortality also seems to vary acoording to country, climate and many other factors.

Large differences in mortality rates from chronic bronchitis are seen between different regions in the same country and these differences are not accounted for by differences in smoking.

Differences in bronchitis mortality among different occupational groups and social classes have not been related to cigarette smoking.

Heavier smokers have not always been found to be more frequently affected with chronic bronchitis, dyspnea or other forms of pulmonary insufficiency than lighter smokers.

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Differences in the incidence of functional symptoms between men and women smokers are likewise unexplained by the smoking hypothesis.

E. F. Is there need for further research before our knowledge of these diseases will be sufficient to dispel the confusion arising from the present status of our data?

In view of the many important gaps in the knowledge of chronic respiratory diseases and the many factors which have been found to be associated with morbidity and mortality from these diseases, it seems evident that further study of their clinical, pathological and epidemiological manifestations is necessary in order to lay a foundation for any conclusions concerning the roles of possible etiological factors.

Thus the method and degree of influence, if any, of such environmental factors such as atmospheric pollution, smoking and climatic and living conditions needs further investigation. The importance of infectious diseases in

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childhood and later life, congenital and developmental defects, and general constitutional factors which some investigators suggest may be determining influences, should be explored further. The effects of bacterial, viral and fungal agents on lung tissues are far from understood.

The significance of the association of some chronic lung diseases with affections of other organ systems (e.g., emphysema with peptic ulcer) should be considered.

Further research to refine the definition and classification of lung diseases is needed in order to establish meaningful associations with particular factors. Standardardization of diagnostic nomenclature and procedures for determining and recording underlying causes of death and the establishment of a uniform system of classification and coding of death certificates would make possible comparison of statistics from place to place and would result in more reliable indications of the nature and extent of the problem.

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Study of complete personal and clinical histories of individuals with significant signs and symptoms of chronic respiratory ailments and further efforts to correlate structual and functional abnormalities might yield helpful data.

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